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RECONNAISSANCE OPERATIONS IN AIRLAND BATTLE - FUTURE

Support Analysis for TRADOC Warfighter GOWS I

United States Army Armor School

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Report evaluates the ability of ground and air-based Cavalry Regiments to perform reconnaissance and security in AirLand Battle-Future. The report uses a Post-CFE scenario to evaluate the requirements.

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RECONNAISSANCE OPERATIONS
IN AIRLAND BATTLE - FUTURE

1. Purpose. To determine the ability of different reconnaissance organizations to perform AirLand Battle - Future missions.

2. Background.

a. Major changes are occurring around the world that radically change the balance of forces. To address the changes, TRADOC is conducting analyses to provide the best warfighting concept and the organization and equipment to execute it. The warfighting concept is known as AirLand Battle - Future (ALB-F). This concept focuses on future non-linear battlefields that could be in any part of the world. ALB-F has four phases: Detection and Verification, Fires, Maneuver and Recovery.

b. As a part of that effort, the U.S. Army Armor School evaluated four potential corps-level reconnaissance organizations in the first two phases of ALB-F. These organizations were designed to capitalize on current and future technologies to gain insights as to the best organization and equipment for reconnaissance forces.

c. The four alternatives were evaluated on their ability to conduct reconnaissance, assist initial indirect fires, conduct counter-reconnaissance and separate the enemy in space and time. These functions support the detection and verification and fires phases of ALB-F.

d. The alternatives examined were:

Base Case: Current Armored Cavalry Regiment (ACR) equipped with Blk III tanks, FRV, NLOS, and LHX.

Alternative 1: Base Case ACR plus a Reconnaissance Squadron with Future Scout Vehicles (FSV).

Alternative 2: Two Air Cavalry Squadrons (LHX) with three Reconnaissance Squadrons (FSV).

Alternative 3: Similar to Alternative 1 but with Future Cavalry Vehicles (FCV) replacing tanks and FRV. FCVs were Armored Gun System - like vehicles with low protection levels and 105mm guns.

Detailed descriptions of the Alternatives are at TAB A.

e. All four alternatives were supported by an Attack Helicopter Battalion (LHX and AH-64s) a DS Artillery Brigade consisting of two AFAS Battalions and three MLRS Battalions.

3. Essential Elements of Analysis.

a. How well does each alternative conduct reconnaissance?

b. How much does each alternative assist the initial indirect fires?

c. How well does each alternative conduct counter-reconnaissance?

d. How capable is each alternative of separating the enemy in space and time after performing the counter-reconnaissance mission?

4. Summary of Results. The addition of a Reconnaissance Squadron improves the force's ability to perform reconnaissance. Air Cavalry can conduct reconnaissance as well as Ground Cavalry but loses the counter-reconnaissance battle. Ground reconnaissance forces are necessary to win the counter-reconnaissance battle and retain sufficient combat power (direct and indirect fire) to start separating the enemy main body formations.

5. Methodology.

a. Janus was used to evaluate the alternatives. The system data came from the HFM COEA and LHX COEA. The alternatives were drawn in random sequence. A modification to the run stream had to be made due to data problems in Alt 3. The original and modified run streams are shown in Figure 1. The five Alt 3 runs were clustered in the last 10 games which may have induced some "learning curve" effect in the Alt 3 results. Four of the five Base Case runs were in the last 11 which also may have affected the Base Case results.

RUN STREAM COMPARISON

INTENDED	ACTUAL
ALT 1	ALT 1
ALT 2	ALT 2
ALT 2	ALT 2
ALT 1	ALT 1
ALT 2	ALT 2
ALT 1	ALT 1
ALT 1	ALT 1
ALT 2	ALT 2
BASE CASE	BASECASE
ALT 3	BASE CASE
ALT 3	ALT 2
ALT 2	ALT 3
ALT 2	ALT 3
BASE CASE	BASE CASE
ALT 2	ALT 3
ALT 3	ALT 2
ALT 3	BASE CASE
BASE CASE	ALT 3
BASECASE	BASE CASE
ALT 2	ALT 3

Figure 1

b. The three Blue gamers for each run were chosen randomly from two pools of gamers. The first pool consisted of four Armor and Infantry officers who were advanced course graduates. Three of the four were former company/troop commanders. Two gamers were drawn to man ground maneuver Janus stations for each run. The other pool consisted of two Aviation officers who were advanced course graduates and former company/troop commanders. One gamer was drawn randomly for each run to man the aviation Janus station.

c. One Red gamer was used for the first 15 runs. A replacement gamer was used for the last five. The replacement Red gamer was equally adept at manipulating Janus and in Red tactics as the first. The change did not appear to affect the subsequent runs. Both gamers were from Threat Division, Directorate of Combat Developments, USAARMS.

d. Janus used three Blue and one Red station. This was done to facilitate control of the large number of Blue reconnaissance force systems.

e. The simulation ended when the Red main body made direct fire contact with the Blue reconnaissance force. At that point, the Red reconnaissance units had all passed through the Blue force or been destroyed. The arrival of the Red main body signaled the end of the counter-reconnaissance battle.

f. Statistical significance was determined using the Mann-Whitney U-Test at 90% confidence level.

6. Measures of Effectiveness.

a. Number of unique detections - A unique detection is defined as the first Blue detection of a Red system. Subsequent detections are ignored to avoid double-counting. The scout's reconnaissance mission requires him to report all enemy activity (or lack of it) he encounters. The more complete his reconnaissance, the more Red systems the scout will report. Unique detections is an indicator of the intelligence picture that will be produced based on the scouts' reports.

b. Number of deep targets killed by artillery - Deep is a relative term dependent on echelon. In this instance, deep targets are defined as any beyond the reconnaissance force's direct-fire range. This includes targets cued by the FSVs, UAVs, and counterbattery radars.

c. Number of Red reconnaissance patrols that pass through the reconnaissance force - Red reconnaissance patrols typically consist of 3-5 BMPs and/or 1-2 tanks. The better the counter-

reconnaissance ability of the reconnaissance force, the fewer that will get through.

d. Blue artillery losses due to Red reconnaissance patrols - Red reconnaissance patrols have the express mission of finding nuclear-capable systems and destroying them within their capabilities. Although the reconnaissance force's job is not to provide the artillery protection, the amount of damage Red patrols do measures the consequences of not destroying them.

e. Percent of reconnaissance force remaining after the counter-reconnaissance fight - This measure the ability of the reconnaissance force to complete the counter-reconnaissance fight in a condition to conduct follow-on missions.

f. A cross-walk of the MOE to the EEA is in Figure 2.

MOE / EEA	UNIQUE DETECTIONS	# DEEP ARTY KILLS	RECON PATROLS THAT GOT TO ARTY AREA	BLUE ARTY LOSSES DUE TO RECON PATROLS	% RECON FORCE REMAINING
CONDUCT RECONNAISSANCE	X				
ASSIST INITIAL INDIRECT FIRES		X			
CONDUCT COUNTER-RECON			X	X	X
SEPERATE ENEMY IN TIME AND SPACE				X	X

Figure 2

7. Scenario

a. Threat. The Threat was a Motorized Rifle Division slice composed of the Reconnaissance Battalion, Forward Detachment and Reconnaissance Companies of the two lead regiments and their

associated artillery. Following the reconnaissance units were two motorized rifle regiments. Red equipment and organization was as predicted for 2004.

b. Scheme of maneuver. The Blue Reconnaissance Force assumed a 90 km wide screen line East of and centered on Fulda, West Germany. The Reconnaissance Squadron (in Alternatives 1-3) moved east at the start of the game to acquire the Red forces. Their final positions were 15km east (forward) of the screenline. The reconnaissance squadron acquired targets and attempted to destroy them with artillery and NLOS. If targets were not destroyed, the main elements of the Reconnaissance Force attempted to destroy Threat recon forces with direct fire. Figure 3 depicts the general scheme of maneuver.

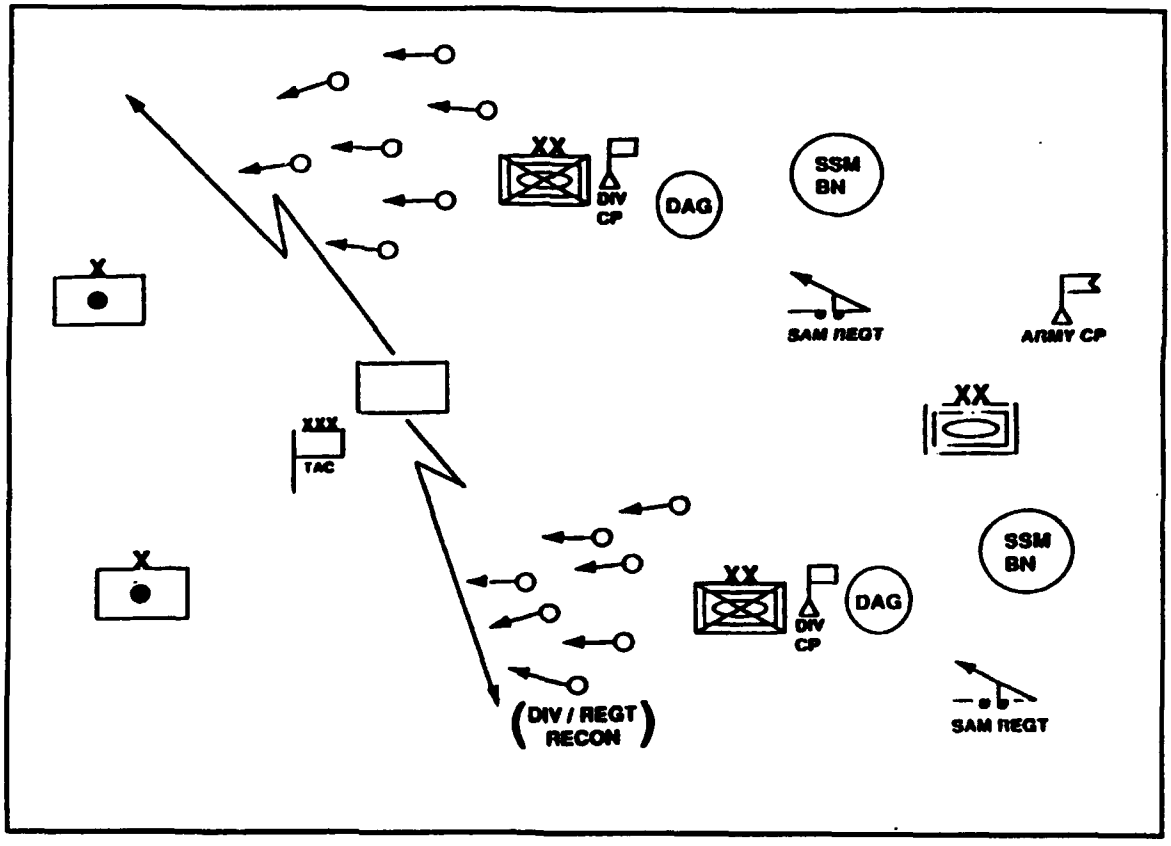

Figure 3

8. **Assumptions.** Current rate of Blue and Red modernization will continue to 2004.

9. Limitations.

a. Due to the number of combat vehicles and size of the Janus map only about 1/3 of the reconnaissance force could be portrayed. One 30km-wide sector was chosen with the appropriate slice of units and attachments.

b. All artillery that could range into the 30 km-wide slice from the DS brigade was portrayed. No corps artillery was portrayed. This limited the targets for Red recon patrols to just the artillery DS to the recon force. In reality the artillery area would be more densely packed with artillery units.

c. Intelligence play in Janus is problematic. To provide the players realistic intelligence feeds simulating future sensor capabilities, 4 UAV were given to each side.

d. The availability of Defense Mapping Agency Terrain was limited by the timelines of this study. The terrain choices were all European due to the previous focus of most studies. This in no way implies that ALB-F is European-focused. The insights gained should be transferable to other areas.

10. Results.

a. Ability to conduct reconnaissance. The Reconnaissance Squadron improved the force's ability to conduct reconnaissance. All three alternatives with the Recon Squadron found more of the enemy force (see Figure 4) than the Base Case without the Recon Squadron. Although only the difference between Alternative 1 and the Base Case is statistically significant, the trend indicates that the Reconnaissance Squadron improved the force's ability to find and report enemy activity in its area of operations.

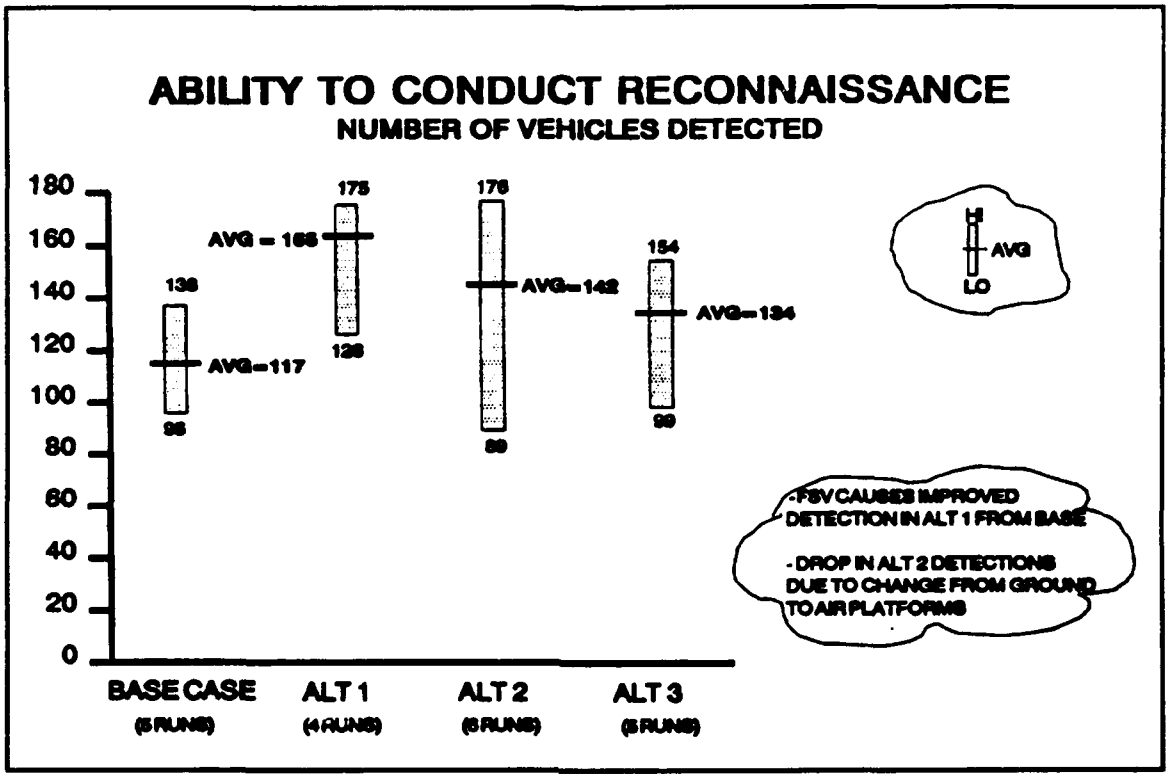

Figure 4

b. Assist initial indirect fire - Alternative 2 was least able to assist the initial indirect fires. This is evidenced by the lack of deep artillery kills compared to the other alternatives (see Figure 5). The low number of deep kills was a result of most of the DS Artillery Brigade being used to support the helicopter direct fire fight and not available to shoot deep. In the other alternatives ground units needed less indirect fire support to accomplish their mission. Consequently, most of the artillery was able to engage targets before they entered direct fire range and to fire counterbattery missions. The difference between Alt 2 and all others is statistically significant. Differences between Base Case, Alt 1 and Alt 3 are not significant.

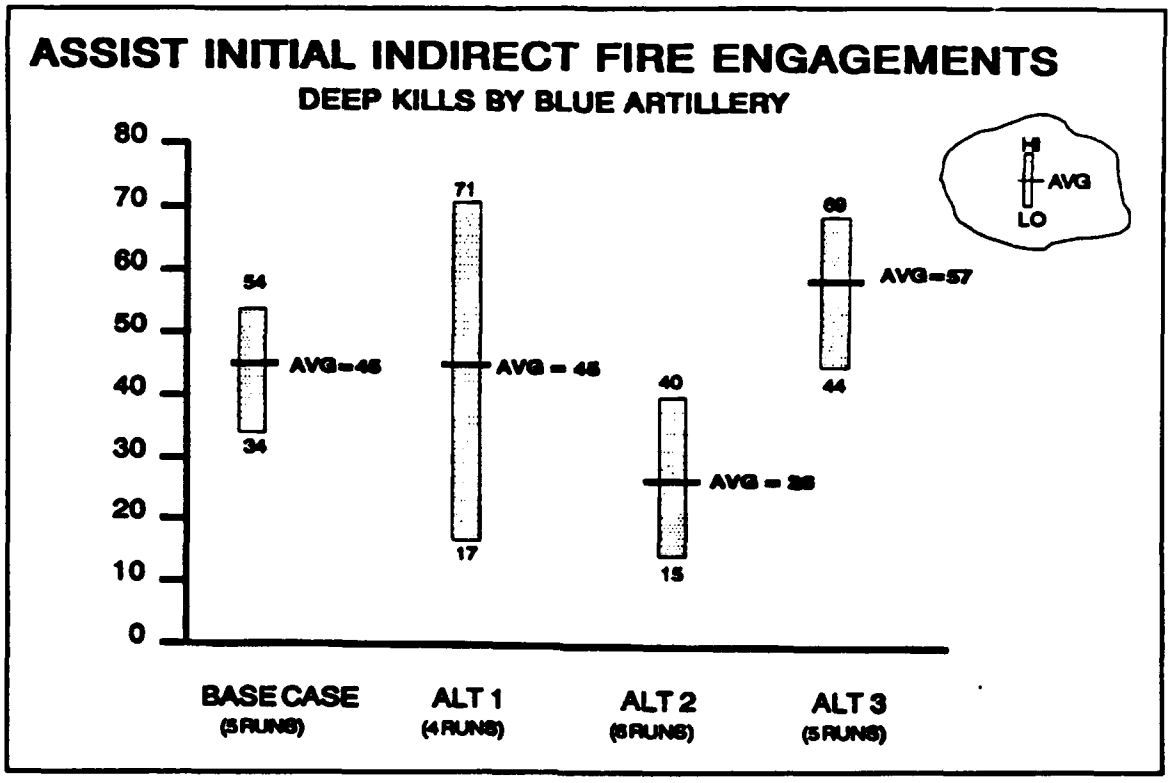

Figure 5

c. Conduct counter-reconnaissance.

(1) Base Case, Alt 1 and Alt 3 won the counterreconnaissance battle. They destroyed all Red reconnaissance patrols and retained most of their combat power. Alternative 2 had difficulty maintaining contact with Red recon patrols as they moved in and out of woodlines and built-up areas. Consequently an average of 4.5 patrols passed through to the artillery area (see Figure 6).

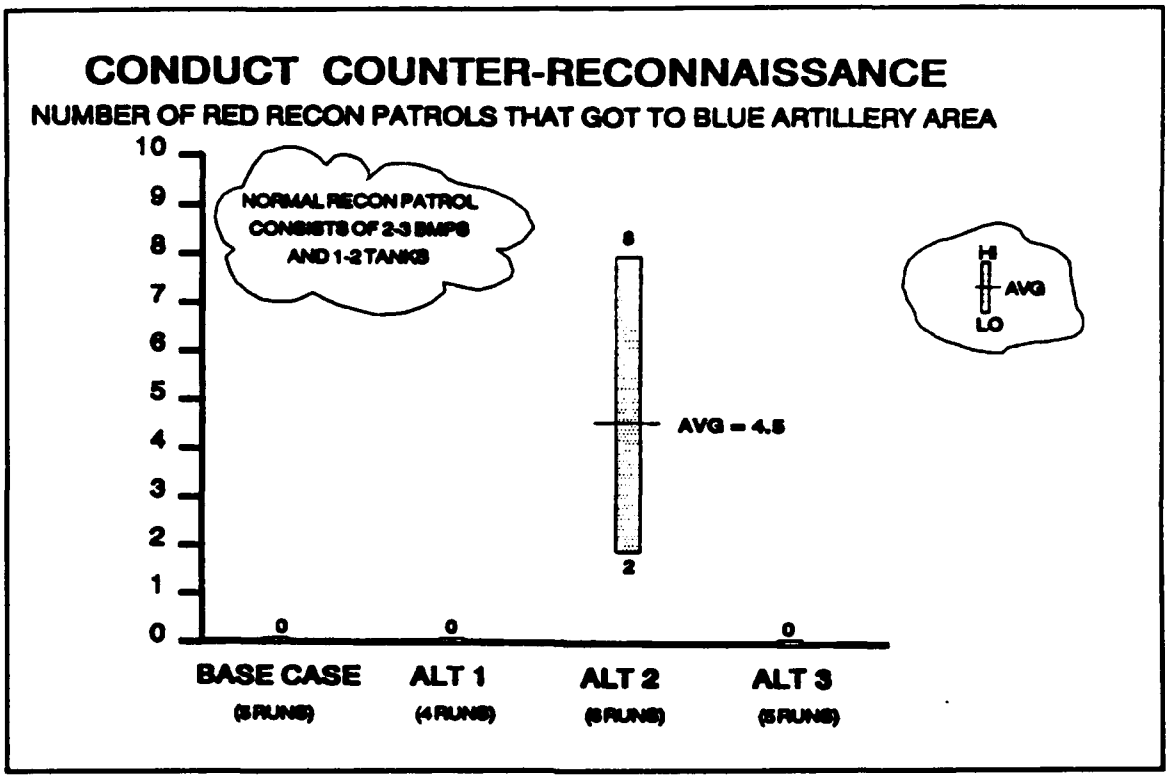

Figure 6

(2) The mission of the Red patrols was to gain intelligence on Blue positions and destroy nuclear-capable systems within their capabilities. In Alt 2 they destroyed an average of 21 of the 102 artillery pieces (guns and MLRS) behind the reconnaissance force (see Figure 7). Due to the game board size limitations of the Janus simulation, the corps artillery could not be fully arrayed. The density of Blue artillery units would, in actuality, be much greater than portrayed. The simulation also was stopped when the reconnaissance patrols reached the edge of the game board; still in the corps artillery area. The effect of these two limitations was to minimize artillery losses. In addition, the Red patrols would have continued west developing intelligence until destroyed.

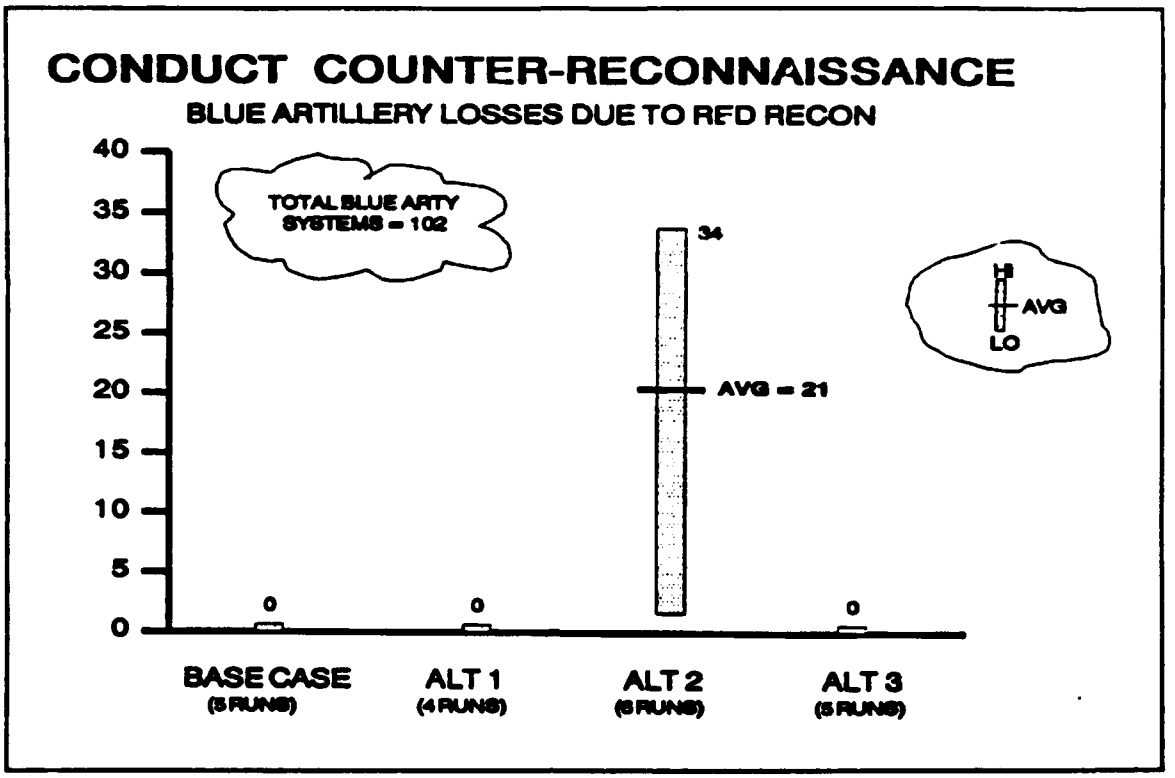

Figure 7

(3) The difference between the Alt 2 results and the others is statistically significant. The difference between the Base Case, Alt 1 and Alt are not significant.

d. Ability to separate the enemy in space and time -

(1) To separate the enemy a force must be able to strike both close and deep simultaneously. The Base Case, Alt 1 and Alt 3 retained credible direct and indirect fire combat power (see Figure 8). They did, therefore, have the potential to separate the enemy. Alternative 2 had only 37% of the reconnaissance force remaining and 80% of the artillery force.

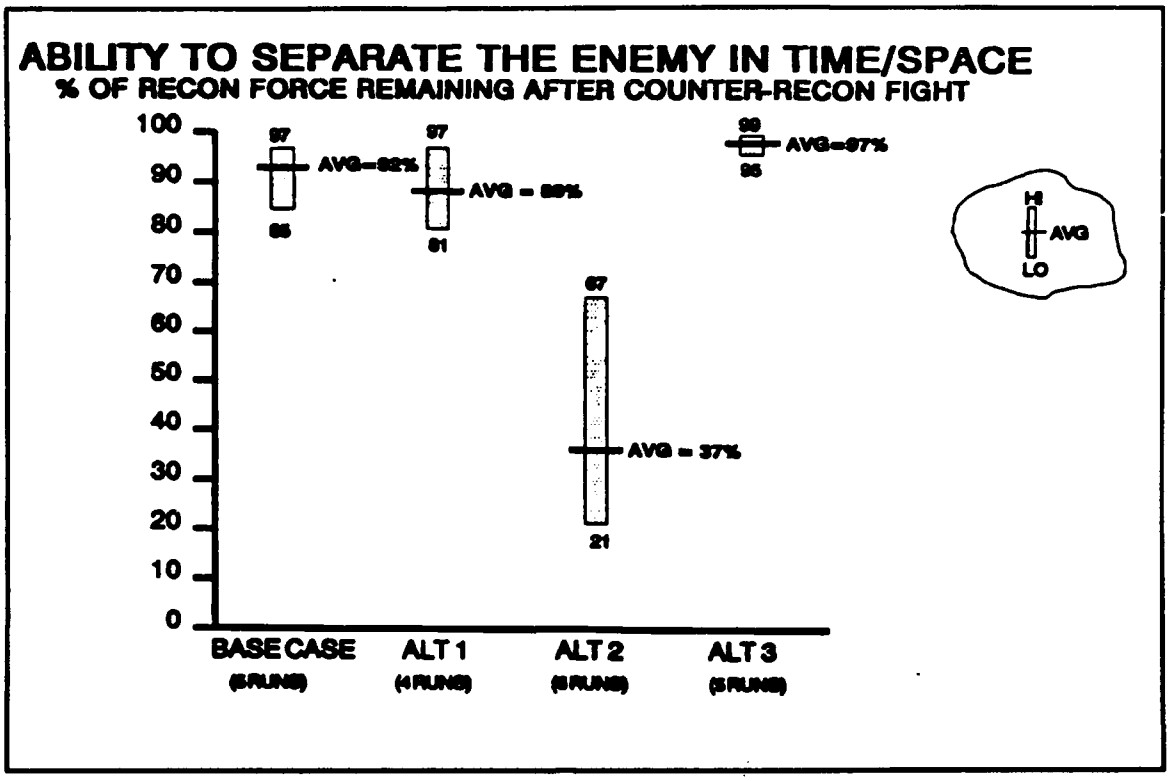

Figure 8

(2) At the end of the simulation, all remaining reconnaissance force aircraft in Alt 2 had been on-station for almost 90 minutes. Ninety minutes is the maximum planning figure for LHX station time. They would have had to leave station to refuel leaving the entire corps sector uncovered just as the enemy main body appeared on the battlefield. The corps would be forced to use precious attack assets to provide manned reconnaissance and maintain contact with the enemy force. Alt 2, then, had less ability to separate the enemy than the numbers indicate.

(3) The difference between Alt 2's end strength and the other end strengths shown in Figure 8 is statistically significant. Differences between the Base Case, Alt 1 and Alt 3 are not significant.

e. Conclusions.

(1) The addition of the Reconnaissance Squadron significantly improved the reconnaissance force's ability to conduct reconnaissance. Figure 9 provides a summary of the MOE results and subjective ratings green to red.

SUMMARY RESULTS

	BASE	ALT 1	ALT 2	ALT 3
CONDUCT RECON	AMBER	GREEN	AMBER	AMBER
# VEHICLES DETECTED	(117)	(165)	(142)	(134)
ASSIST INITIAL INDIRECT FIRE ENGAGEMENTS	GREEN	GREEN	AMBER	GREEN
# OF DEEP KILLS BY BLUE ARTY	(45)	(45)	(26)	(57)
COUNTER RECON	GREEN	GREEN	RED	GREEN
# RED RECON PATROLS IN ARTY AREA	(0)	(0)	(5)	(0)
BLUE ARTY LOSSES	(0)	(0)	(21)	(0)
SEPARATE THE ENEMY IN TIME / SPACE	GREEN	GREEN	RED	GREEN
%RECON FORCE REMAINING	(92)	(89)	(37)	(97)
	(5 RUNS)	(4 RUNS)	(6 RUNS)	(5 RUNS)

Figure 9

(2) A ground direct-fire force is required to both support the initial indirect fires and conduct counter-reconnaissance.

(3) Base Case, Alt 1, and Alt 3 retained sufficient combat power (direct and indirect fire) to strike the enemy close and deep simultaneously to separate the enemy in time and space. Further analysis must be conducted to determine advantages and capabilities of Alts 1 and 3.

f. Additional Observations.

(1) NLOS was an extremely effective system. Six NLOS systems (8% of the total recon force) accounted for 28-47 kills (17-27% of the total) during the counter-reconnaissance fight.

(2) The radar-evading capabilities of the LHX protected it from ADA weapons. Virtually all helicopters kills were by direct fire from BMPs and tanks at ranges of 12-1500m.

GAMED TASK ORGANIZATION

BASE CASE		ALT 1		ALT 2		ALT 3	
M1 BLK III	41	M1 BLK III	41	FSV	20	AGS	82
FRV (M3AX)	36	FRV (M3AX)	36	LHX	41	FSV	20
81MM MORTAR	6	81MM MTR	6	PMS	2	LHX	42
AFASC	8	AFASC	8	ADATS	2	NLOS-AT	8
LHX	33	FSV	20	NLOS-AD	2	PMS	2
PMS	2	LHX	42			ADATS	2
ADATS	2	NLOS-AT	8			NLOS-AD	2
NLOS-AD	2	PMS	2				
		ADATS	2				
		NLOS-AD	2				

CORPS ASSETS AVAILABLE IN ALL RUNS

AFASC	48
MLRS	54
AH-64	12
OH58D (A/A)	8

RECONNAISSANCE FORCE TASK ORGANIZATION

BASE CASE		ALT 1		ALT 2		ALT 3	
M1 BLK III	123	M1 BLK III	123	FSV	165	AGS	164
FRV (M3AX)	114	FRV (M3AX)	114	LHX	106	FSV	55
81MM MORTAR	18	81MM MTR	18	NLOS-AT	12	LHX	106
AFASC	24	AFASC	24	PMS	6	NLOS-AT	12
LHX	33	FSV	55	ADATS	8	PMS	6
PMS	6	LHX	53	NLOS-AD	6	ADATS	8
ADATS	8	NLOS-AT	12			NLOS-AD	6
NLOS-AD	6	PMS	6				
		ADATS	8				
		NLOS-AD	6				